REMARKS

The Office Action in the above-identified application has been carefully considered and this amendment has been presented to place this application in condition for allowance. Accordingly, reexamination and reconsideration of this application are respectfully requested.

Claims 49-76 are in the present application. New claims 49 to 70 are based on the previous claims, 27 to 48, respectively, and have been amended in order to overcome the objections raised in this office action. New claims 71 to 76 are new independent claims. It is submitted that these claims, are patentably distinct over the prior art cited by the Examiner, and that these claims are in full compliance with the requirements of 35 U.S.C. § 112. The new claims, as presented herein, are not submitted for the purpose of patentability within the meaning of 35 U.S.C. sections 101, 102, 103 or 112. Rather, these claims are submitted simply for clarification and to round out the scope of protection to which Applicants are entitled. Claims 27-54 are canceled.

The Specification was objected to because of various informalities in the disclosure. In response, section headings have been inserted and the references to specific claims have been deleted on page 6. Accordingly, Applicants believe this objection has been overcome.

The claims were objected to because of various informalities. The newly presented claims correct for the Examiner's objection that the claims should begin "A receiving apparatus" and "The receiving apparatus." However, the means limitations have not been changed, since "receiving means" is intended to cover the possibility of having multiple receiving means

whereas "a receiving means" would be limited to a single receiving means. Accordingly, Applicants believe the claim objections have now been overcome.

Claims 34-37 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Claims 45-48 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for not providing sufficient antecedent basis for "said detection step." In view of the lack of enabling the disclosure objection against current claims 56 to 59 and the lack of sufficient antecedent objections against current claims 67 to 70, the claim language has been correspondingly amended. In claims 56 to 59, the first alternative in form of the correlation means has been deleted. Since new claim 49 already defines the detection means, it is clear that the further processing defined in claims 56 to 59 is performed on the basis of the processing result obtained from the detection means. It is to be noted that the wording of the current claims 56 to 59 was the original wording which related back to the wording of original claim 27, which did not include the detection means. New claims 67 to 70 have been amended in a similar way by deleting the feature "correlation step". Further, the wording of claim 60 has been amended by explicitly defining the "detecting" of the correlation peak so that the corresponding antecedent basis for "said detection step" in claims 67 to 70 is ensured.

Claims 27, 28, 38, and 39 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ballarin et al. (EP 0 702 467). Claims 29, 32, 40, and 43 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ballarin.

New independent claims 49 and 60 have been amended in order to overcome the Ballarin reference. Specifically, in both new claims 49 and 60, the feature has been added that "each

repetition pattern comprises a number of samples, the number of samples being the same in each repetition pattern". This feature is e.g. disclosed on page 8, lines 4 to 8, page 5, lines 13 to 16 and page 12, lines 11, to 13. Hereby, it has to be noted that the term "repetition pattern" is intended to indicate that the shape or form of each repetition pattern is repeated in the other repetition patterns, so that the repetition patterns are mutually identical (except of course the last repetition pattern which is phase-shifted in relation to the other repetition patterns according to the present invention).

It is recognized that Ballarin discloses a synchronisation technique for synchronising a receiver of a digital transmission system to a transmitter. The synchronisation of the receiver is hereby obtained by making use of the repetition of signals transmitted by the transmitter (cf. column 1, lines 43 to 45). Hereby, a reference sequence is used, which is formed by a first series which repeats signals modulated by the states A and B of the constellation in the order ABABAB.., and a second series which repeats signals modulated by the states C and D of constellation in the order CDCDCD... (cf. column 3, lines 6 to 14). For example, the reference sequence is "ABABABABCDCDCDCD", i.e. consists of 16 states formed by two groups of 8 states spread over either side of the transition. The transition between the states AB and CD is used by the correlation means to detect a correlation peak (cf. column 4, lines 10 to 15 and column 3, lines 36 to 40). Therefore, it is to be noted that each of the states A, B, C and D are modulation states of the QAM4 modulation and that nothing is said about the content of information which is transmitted within these modulation states. Therefore, it is not possible to determine if the reference sequence suggested by Ballarin uses repetition patterns at all. As stated above, repetition patterns in the meaning of the present invention are repetitive (identical) numbers of samples. In contrary hereto, Ballarin only discloses modulation states. Further,

Ballarin discloses a reference sequence with a transition in the middle of the reference sequence, namely the transition from the modulation state B to the modulation state C. Therefore, even if the Examiner, as indicated in the office action, interprets the sequence of modulation states "ABABABAB" as one repetition pattern and the sequence of modulation states "CDCDCDCD" as another repetition pattern, the correspondingly formed reference sequence does not comprise the plurality of repetition patterns, but only two petition patterns with a transition in the middle of the reference sequence. In contrary hereto, the present invention suggests a reference symbol comprising a plurality of successive repetition patterns, in which the last repetition pattern is phase-shifted in relation to the other repetition patterns. Such a reference symbol as defined by the present invention greatly enhances the synchronising performance and reliability as described on page 7, lines 19 to 22 of the specification and as apparent from the simulation results shown in Figs. 8 and 12 of the present application. Ballarin does not define a reference symbol with such a configuration and with such advantages.

Accordingly, for at least this reasoning, Ballarin fails to anticipate or obviate the present invention and the present claims should be allowed.

Claims 27-29 and 38-40 were rejected under 35 U.S.C. § 102(e) as being anticipated by Dölle et al. (U.S. Patent 6,160,821).

Generally, the synchronisation in a telecommunication system can be achieved by performing a correlation of a received reference symbol (or synchronisation pattern) in a receiving apparatus of the telecommunication system, Hereby, two essentially different correlation mechanisms are known, namely auto-correlation on the one hand and cross-correlation on the one hand. An auto-correlation mechanism does not require any knowledge

about the reference symbol on the receiver side, since a received reference symbol is auto-correlated with itself. A cross-correlation mechanism, however, requires an exact knowledge about the reference symbol to be received on the receiver side. Hereby, a copy of the expected reference symbol is stored in the receiver and compared with the received reference symbol (cf. page 3, lines 12 to 18 of the present application). The subject matter of the present invention is explicitly directed and limited to cross-correlation. All independent claims 49, 60 and 71 to 76 specify that the synchronisation is performed by cross-correlating the plurality of repetition patterns.

In contrary hereto, Dölle explicitly and exclusively relates to auto-correlation. For example, column 1, lines 22 to 25 of Dölle describe that on the receiving side the time domain correlation between the received signal containing the reference symbol and a delayed version of the signal is effected to identify the reference symbol and thus to determine the timing for the synchronisation. Further, column 2, lines 11 to 13 describe that the received signal is correlated to a delayed version of itself. Further, column 4, lines 49 to 51 describe that means are provided for correlating the transmitted reference symbol with a delayed reference symbol to detect a correlation peak. Column 7, lines 24 to 26 make reference to the correlator of the prior art as shown in Fig. 7 which is described between column 1, lines 66 and column 2, line 19. The auto-correlation is achieved by using delay circuits (cf. column 7, lines 27 to 36). Thus, Dölle exclusively discloses auto-correlation, but does not mention cross-correlation at all.

Accordingly, for at least this reasoning, Dölle fails to anticipate the present invention and the present claims should be allowed.

Claims 32 and 43 were rejected under 35 U.S.C. § 103(a) as being obvious over Dölle in

view of Ballarin. However, the combination of Dölle with Ballarin does not address any the failings of either reference alone, as discussed above. Accordingly, for the reasons discussed previously, the combination of Dölle and Ballarin fails to render the present invention obvious and the present claims should now be allowed.

In addition, as noted by the Examiner, the obviousness rejection based on Dölle et al. (US 6,160,821) can be overcome by simply submitting evidence that the present application and Dölle are owned by the same entity; i.e. Sony International. Enclosed find a copy of the Notice of Recordation of Assignment showing the present application is assigned to Sony International. Sony International is the same entity to which the Dölle reference is assigned (on its face). Also note, that two of the inventors on the present application, Thomas Dölle and Tino Konschak, are named inventors on the Dölle patent. Therefore, the Dölle reference is not an invention "by another." Thus, the Dölle reference cannot be used in an obviousness rejection against the present application.

New independent claims 71 and 72 include the limitation, that "each of the repetition patterns comprises a number of samples, the number of samples being the same for each repetition pattern". New independent claims 71 and 72 additionally comprise the limitation that a time and a frequency synchronisation is performed in the receiving apparatus using the received reference symbol. New claims 73 to 76 comprise the limitation that the cross-correlation in the receiver is used to perform a time domain synchronisation and for detecting a frequency offset between the transmitter device and the receiver device to perform a frequency synchronisation. These features are e.g. disclosed on page 7, lines 5 to 10 of the specification of the present application.

Additionally, new independent claims 71 to 76 are now limited to an OFDM (orthogonal frequency division multiplexing) telecommunication system, which is e.g. disclosed on page 7, lines 10 to 12 of the present application

Ballarin does not relate to an OFDM (orthogonal frequency division multiplexing) telecommunication system, in which a time and frequency synchronisation on the receiver side is achieved by a reference symbols as defined in the claims and discussed above. Ballarin only generally relates to a digital transmission system (cf. column 1, lines 7 to 12) in which the mentioned reference sequence is used for a time synchronisation only (cf. column 3, lines 15 to 18). Hence, Ballarin does not relate to an OFDM telecommunication system nor to a frequency synchronisation.

Therefore, in addition to the reasons discussed above in relation to the previous claims, the subject matter of new independent claims 49, 60 and 71 to 76 is considered to be inventive over the cited prior art.

Applicants appreciate the acknowledgment by the Examiner that claims 30, 31, 33, 41, 42, and 44 would be allowable if rewritten in independent form. However, at this time, Applicants have decided not to make these claims allowable in this manner.

In view of the foregoing amendment and remarks, it is respectfully submitted that the application as now presented is in condition for allowance. Early and favorable reconsideration of the application are respectfully requested.

Fees for extra total claims and independent claims in excess of three are deemed to be required for the filing of this amendment. No additional fees are anticipated, but if such are required, the Examiner is hereby authorized to charge any insufficient fees or credit any overpayment associated with the above-identified application to Deposit Account No. 50-0320.

If any issues remain, or if the Examiner has any further suggestions, he/she is invited to call the undersigned at the telephone number provided below. The Examiner's consideration of this matter is gratefully acknowledged.

Respectfully submitted,
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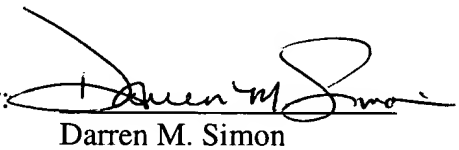
By: 

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